

IN THE CLAIMS:

Claims 1-24 (Canceled)

25. (New) A hydrogen energy system comprising:
- (a) a hydrogen generator for generating hydrogen from electricity received from at least one source of electric energy; and
 - (b) a controller for processing data concerning said at least one source of electric energy.
26. (New) A system as claimed in claim 25 wherein said controller further processes data concerning said hydrogen generator.
27. (New) A system as claimed in claim 25 wherein said controller further processes data concerning hydrogen demand.
28. (New) A system as claimed in claim 25 further comprising a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator.
29. (New) A system as claimed in claim 28 wherein said controller further processes data concerning said hydrogen storage apparatus.
30. (New) A system as claimed in claim 25 wherein said controller controls the generation of hydrogen based on inputs including data concerning said at least one source of electric energy.
31. (New) A system as claimed in claim 30 wherein said controller inputs further include data concerning said hydrogen generator.
32. (New) A system as claimed in claim 30 wherein said controller inputs further include data concerning hydrogen demand.

33. (New) A system as claimed in claim 30 further comprising a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator and wherein said controller inputs further include data concerning said hydrogen storage apparatus.
34. (New) A system as claimed in claim 33 wherein said controller further controls the storage of hydrogen.
35. (New) A system as claimed in claim 25 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.
36. (New) A system as claimed in claim 35 further comprising a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator.
37. (New) A system as claimed in claim 36 wherein said hydrogen is compressed by said compressor prior to storage in said hydrogen storage apparatus
38. (New) A system as claimed in claim 35 wherein said controller controls the generation, compression and storage of hydrogen.
39. (New) A system as claimed in claim 25 wherein said hydrogen generator generates hydrogen at a minimum desired pressure.
40. (New) A system as claimed in claim 28 further comprising a hydrogen delivery system for delivering hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus to a hydrogen user.
41. (New) A system as claimed in claim 40 wherein said hydrogen user is a hydrogen conversion device for powering a vehicle.
42. (New) A system as claimed in claim 28 further comprising a hydrogen conversion device for receiving hydrogen from at least one of said hydrogen generator and said hydrogen storage device and converting said hydrogen into electricity.

43. (New) A system as claimed in claim 42 wherein said hydrogen conversion device is an internal combustion engine.
44. (New) A system as claimed in claim 42 wherein said hydrogen conversion device is a fuel cell.
45. (New) A system as claimed in claim 28 further comprising a hydrogen conversion device for receiving hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus and converting said hydrogen into thermal energy.
46. (New) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid.
47. (New) A system as claimed in claim 46 wherein electricity for said electricity grid is produced by a plurality of primary energy resources.
48. (New) A system as claimed in claim 47 wherein said primary energy resources include renewable resources.
49. (New) A system as claimed in claim 47 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
50. (New) A system as claimed in claim 25 wherein said energy source data includes real time data.
51. (New) A system as claimed in claim 25 wherein said energy source data includes historical data.
52. (New) A system as claimed in claim 25 wherein said energy source data includes forecasted data.
53. (New) A system as claimed in claim 25 wherein said energy source data includes energy cost data.

54. (New) A system as claimed in claim 30 wherein said controller modulates the generation of hydrogen by said hydrogen generator based on data including said energy source data.
55. (New) A system as claimed in claim 42 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy source data.
56. (New) A system as claimed in claim 55 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.
57. (New) A system according to claim 25 wherein said at least one source of electric energy includes at least one non-grid source of electric energy.
58. (New) A system as claimed in claim 57 wherein electricity for said at least one non-grid source of electric energy is produced by at least one primary energy resource.
59. (New) A system as claimed in claim 58 wherein said at least one primary energy resource includes renewable resources.
60. (New) A system as claimed in claim 59 wherein said renewable resources include at least one of wind, solar, and hydro.
61. (New) A system as claimed in claim 57 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.
62. (New) A system as claimed in claim 30 wherein said at least one source of electric energy includes an electricity grid and at least one non-grid source of electric energy and wherein said controller selects one of said at least one sources of electric energy based on data including said energy source data.
63. (New) A system as claimed in claim 62 further comprising a device for converting hydrogen into electricity.

64. (New) A system as claimed in claim 63 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy source data.
65. (New) A system as claimed in claim 64 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.
66. (New) A system as claimed in claim 25 wherein said energy source data includes data pertaining to emissions associated with the primary energy resources used for producing said electricity.
67. (New) A system as claimed in claim 25 wherein said energy source data includes data pertaining to credits awarded for use of certain energy sources.
68. (New) A system as claimed in claim 25 further comprising hydrogen fuel user means.
69. (New) A system as claimed in claim 29 wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.
70. (New) A system as claimed in claim 28 wherein said hydrogen storage apparatus comprises at least one hydride storage chamber.
71. (New) A system as claimed in claim 28 wherein said hydrogen storage apparatus comprises at least one container for storing pressurized hydrogen.
72. (New) A system as claimed in claim 25 wherein said controller controls the amount of electricity received by said hydrogen generator.
73. (New) A system as claimed in claim 25 wherein said controller controls the duration of electricity supply to said hydrogen generator.

74. (New) A system as claimed in claim 25 wherein said controller comprises a single controller.
75. (New) A system as claimed in claim 25 wherein said controller comprises a processor for processing said data.
76. (New) A system as claimed in claim 25 wherein said controller comprises a processor for processing said data and a control system for controlling the operation of said hydrogen generator.
77. (New) A system as claimed in claim 25 wherein said data is transmitted to said controller using the same wires that are used to deliver said electricity.
78. (New) A system as claimed in claim 25 wherein said data is transmitted to said controller by wireless transmission.
79. (New) A hydrogen energy system comprising:
 - a. a hydrogen generator for generating hydrogen from energy received from at least one energy source;
 - b. a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator;
 - c. a data processor including a hydrogen generator data processor for processing data concerning said hydrogen generator, a hydrogen storage data processor for processing data concerning said hydrogen storage apparatus, a hydrogen demand data processor for processing data concerning hydrogen demand and an energy source data processor for processing data concerning said at least one source of electric energy; and
 - d. a controller for controlling the generation and storage of hydrogen based on inputs including inputs received from said data processor.

80. (New) A system as claimed in claim 79 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.
81. (New) A system as claimed in claim 79 further comprising a device for converting hydrogen into electricity.